

## PLUMBING AND FIRE PROTECTION

### WHEN TO CONSIDER

NEEDS ASSESSMENT	NO	SCHEMATIC DESIGN	YES
MASTER PLANNING	NO	DESIGN DEVELOPMENT	YES
PROJECT STATEMENT	MAYBE	CONSTRUCTION	
ARCHITECTURAL		DOCUMENTS	DONE
PROGRAMMING	YES	CONSTRUCTION	DONE
NO-Need not consider.			
MAYBE-This system may be considered.			
YES-This system should be considered.			
DONE-This system should have already been considered.			

### DESCRIPTION

Your plumbing and fire protection system consists of the plumbing fixtures, such as sinks and toilets, the piping connecting these fixtures and the building fire protection system (sprinklers or firehose cabinets). Two primary areas in which you can control plumbing costs are the selection of appropriate fixtures and fire protection systems.

### RELATIONSHIP TO OTHER SYSTEMS

Fire protection systems are determined by the design of the facility and consideration of variable such as areas between fire-rated walls, location of access doors and location of the building on the site. Plumbing fixtures affect the surfaces they are fastened to and the means by which the piping to these fixtures will be accomplished.

### ALTERNATIVES

The type of people who will be using the fixtures is a key consideration in their selection. Many types of institutional and correctional fixtures are available. Three categories are most commonly used: stainless steel, security porcelain, and standard commercial-grade porcelain.

Most correctional facilities have numerous toilet fixtures. Consequently, the selection of these fixtures will affect the cost of your facility substantially. Your design team should establish which areas will need individual fixtures for each cell as early as possible. Consider your high security areas and whether your low security areas will have gang toilets.

Once you've determined this, you can make your selections. Explore different scenarios to see what the cost range could be.

When choosing fixtures be sure to consider all of the costs involved, including the valves and piping necessary to operate plumbing fixtures. Although a wall-mounted toilet fixture may cost the same as a floor-mounted toilet, installation of the floor-mounted fixture will be less expensive. Wall-mounted fixtures require added valves

and supports. Wall-mounted fixtures often are specified because they are easier to clean, but they also are subject to breakage by abusive inmates.

In addition to toilet and sink fixtures for inmate housing areas, you will need numerous other plumbing fixtures for showers, drinking fountains, and staff and public toilets. Once again, appropriate use will determine cost, but consider that buying one product in volume is usually less expensive than buying numerous different kinds of fixtures. One way to get a good price is to pre-purchase them directly from the manufacturer. You would supply them and the contractor would install them. If you do this far enough in advance, you may be able to receive bids on the fixtures desired and on an alternate that may be less expensive or more secure. The benefit is having actual costs to consider before making a decision. Because security fixtures can be long-lead items, an extended delivery schedule also may reduce the cost.

Alternatives in urinals are similar to toilet fixtures. Stainless steel security fixtures cost the most, security porcelain fall next in line, and commercial-grade fixtures are the least expensive. The primary difference between security and commercial porcelain fixtures is the security fixtures have push-button valves while commercial fixtures have lever valves. Automatic flushing units may be used for gang fixtures but add considerably to the cost of individual urinals.

Shower area construction alternatives include:

- Prefabricated stainless steel units are very durable, vandal-proof and easily maintained, but they are expensive.
- Ceramic tile over conventionally constructed walls and floors is cleaned easily and visually appealing for moderate cost, but can be subject to tile breakage and requires some maintenance of grout joints.
- Epoxy paints over masonry or concrete surfaces are probably the most economical solution. Epoxy paints are very durable but require special care to ensure proper installation. The substrate must be properly prepared to achieve an adequate bonding of the epoxy paint.

The cost of a fire protection system and its affect on the design of the entire facility varies substantially depending on the designer's creativity and willingness to thoroughly explore the possibilities allowed within applicable codes. Fire and life safety in an environment where inmate movements are restricted must be considered carefully, but an overly conservative and uncreative approach to

meeting building code requirements can add 1 to 3 percent to the cost of the building. It is essential to know how the exiting, occupancy requirements and construction type will affect this system before moving beyond schematic design, because once the floor plan and sections are established, it becomes very difficult to modify a design to meet code requirements in an economical way.

Determine at your earliest opportunity whether the building requires a fire sprinkler system. Factors which determine this are:

- The occupancy classification of all spaces (one building will often have different occupancy classifications for different areas) and the construction type (type refers to type 1, 11, III, etc. with combustibility ratings, such as fire-resistive, noncombustible, combustible, etc.).
- The open areas around the building and proximity to other buildings.
- The area of the building or of separated spaces within the building. Because correctional facilities are constructed of substantial materials for security purposes, many of the walls, roof and floor assemblies will already have ratings and can be used to separate the building into smaller components.
- The number of access points into the building from the outside can determine whether sprinklers are required. Often a few additional doors can be added to eliminate the need for sprinklers. Once the floor plan is established, it may be too late to add doors.

Sprinkling of correctional buildings requires special care to keep the piping and heads as inaccessible as possible (to avoid inmates setting off the sprinkler system). Routing of pipes and location of heads is a design decision which should be considered during schematic design and finalized during design development. The cost of concealed heads and piping increases substantially the cost of a conventional sprinkler system.

Plumbing Fixtures Matrix

		ALTERNATIVES							
		STAINLESS STEEL COMBINATION UNITS	PORCELAIN SECURITY FIXTURES	HANDICAPPED	WALL-MOUNTED STANDARD	FLOOR-MOUNTED STANDARD			
CRITERIA		<div><div></div>SOMETIMES APPROPRIATE</div>							
		<div><div></div>APPROPRIATE</div>							
	COST								
	LOW								
	MEDIUM								
	HIGH								
	SECURITY								
	LOW/NONE								
	MEDIUM								
	HIGH								
	DURABILITY								
	LOW								
	MEDIUM								
	HIGH								
	SCHEDULE								
	SLOW								
	MEDIUM								
	FAST								